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By-Wolf, Richard M.

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By scoring students' responses to items comprising a formative evaluation test, a Fortran IV computer program provides information on the behavior of each test item and for each objective tested by the items. The program outline includes a general description, job deck card order, instructions for card preparation, and a brief technical note. Minor changes in input and output tape numbers will adapt the Honeywell 800 format for other computers. A sample output of a test measuring first grade students' ability to identify objects, letters, sounds, and words, is appended. (JK)

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# A COMPUTER PROGRAM FOR FORMATIVE EVALUATION

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11300 La Cienega Boulevard
Inglewood, California, 90304

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# A COMPUTER PROGRAM FOR FORMATIVE EVALUATION

Richard M. Wolf

## 1. GENERAL DESCRIPTION

The purpose of this program is to provide educational research personnel with information on the behavior of test items in evaluation instruments. Statistics are computed for each test item and for each objective tested by the items. The program accomplishes these functions by scoring students' responses to the items comprising the test.

1.1 Output for this program includes:

1.1.1 For each item -

1.1.1.1 Objective tested by item

1.1.1.2 Correct alternative

1.1.1.3 Proportion of students selecting each alternative as well as omitting the item

1.1.2 For each objective -

1.1.2.1 Proportion of correct responses to items testing the objective

1.1.2.2 Glossary of objectives

(A copy of sample output from the program is presented at the end of this report).

1.2 Limitations per problem:

1.2.1 m, number of items ($1 \leq m \leq 250$)

1.2.2 q, number of objectives ($1 \leq q \leq 25$)

1.2.3 g, grade level tested ($0 \leq g \leq 9$)

1.2.4 t, test form number ($0 \leq t \leq 99$)

1.2.5 k, number of variable format cards ($1 \leq k \leq 9$)

1.3 Estimation of running time and output per problem:

1.3.1 Running time will usually be less than two minutes.

1.3.2 Output will usually be less than three pages.

## 2. ORDER OF CARDS IN JOB DECK

2.1 System Cards

2.2 Program Deck (FORTRAN IV)

2.3 *Data Card

2.4 Control Card (see 3.1)

2.5 Variable Format Card(s) (see 3.2)

2.6 Objective Number Card(s) (see 3.3)

2.7 Correct Answer Card(s) (see 3.4)

2.8 School Name Card(s) (see 3.5)

2.9 Teacher Name Card (see 3.6)

2.10 Objective Name Cards (see 3.7)

2.11 Individual Data Cards

2.12 Signal End of Data Card(s) (see 3.8)

Note: 2.4 through 2.12 may be repeated for as many sets of data to be analyzed.

## 3. CARD PREPARATION

### 3.1 Control Card

Columns 1-2 Test form number ($0 \leq t \leq 99$)

Columns 3-4 Number of objectives ($1 \leq q \leq 25$)

Columns 5-7 Number of items ($1 \geq m \leq 250$)

Column 8 Grade number ($0 \leq g \leq 9$)

Column 9 Number of variable format cards ($1 \leq k \leq 9$)

### 3.2 Variable Format Card(s)

The variable format card(s) is prepared according to instructions set forth in The Use of Library Computer Programs for Statistical Analysis (Wolf, 1967). Information must be punched onto cards with the student identification preceding the responses to the test items. In the development of the variable format statement, the student identification number must be read in with by an Iw specification where w is the width of the field containing the student identification number. The format specification for the student responses is read in F (floating point) format. The usual specification for an item will be F 1.0.

3.3 Objective Number Card(s)

Columns 1-2 Objective number for item 1

Columns 3-4 Objective number for item 2

Columns 5-6 Objective number for item 3

Continue in every two columns; use as many columns as necessary

3.4 Correct Answer Card(s)

Column 1 Correct response for item 1

Column 2 Correct response for item 2

Column 3 Correct response for item 3

Continue for all items; use as many cards as necessary

3.5 School Name Card

Column 1-42 Name of school

3.6 Teacher Name Card

Column 1-42 Name of classroom teacher

3.7 Objective Name Card(s)

Column 1-72 Name of objective 1

Punch the name of each objective on a separate card. There should be as many cards punched as there are objectives. The cards should be arranged in order by objective.

3.8 Signal End of Data Card

This is to be a blank card; it signals the computer that all data have been read. If more than one card is read for each individual case, then the same number of blank cards must follow the last case.

## 4. TECHNICAL NOTE ON THE PROGRAM

This program is written in FORTRAN IV for use on the Honeywell 800

computer. The input and output tapes are 2 and 3 respectively. To adapt the program for use on any other computer would require changes in only the input and output tape numbers. This could be accomplished in about 10 or 15 minutes. No other changes are necessary in order to run the program on any other computer which has a FORTRAN IV compiler.

## REFERENCE

Wolf, R.M. The use of library computer programs for statistical analyses. Inglewood, California: Southwest Regional Laboratory, 1967, 11-22

SCHOOL BAKER ELEMENTARY SCHOOL TEACHER MISS HENRIETTA SULLIVAN

GRADE I

RESULTS FOR ITEMS AND OBJECTIVES FOR TEST I

| ITEM | OBJECTIVE* | CORRECT ALTERNATIVE | PER CENT CORRECT FOR EACH ALTERNATIVE 1 | 2 | 3 | 4 | 5 | OMIT |
|---|---|---|---|---|---|---|---|---|
| 1 | 5 | 3 | . | . | 100. | . | . | . |
| 2 | 5 | 1 | 100. | . | . | . | . | . |
| 3 | 5 | 3 | 17. | . | 67. | . | . | 17. |
| 4 | 5 | 2 | . | 100. | . | . | . | . |
| 5 | 6 | 1 | 67. | . | . | . | . | 33. |
| 6 | 8 | 3 | 33. | . | 67. | . | . | . |
| 7 | 6 | 2 | . | 100. | . | . | . | . |
| 8 | 7 | 1 | 83. | 17. | . | . | . | . |
| 9 | 8 | 2 | . | 100. | . | . | . | . |
| 10 | 8 | 1 | 67. | . | 33. | . | . | . |
| 11 | 7 | 2 | . | 83. | . | . | . | . |
| 12 | 8 | 3 | . | 33. | 67. | . | . | . |

| OBJECTIVE* | PER CENT CORRECT |
|---|---|
| 1 | . |
| 2 | . |
| 3 | . |
| 4 | . |
| 5 | 92. |
| 6 | 83. |
| 7 | 83. |
| 8 | 75. |

*OBJECTIVES

1 = NOT TESTED

2 = NOT TESTED

3 = NOT TESTED

4 = NOT TESTED

5 = TO DEVELOP ABILITY TO IDENTIFY ONE OBJECT WHEN GIVEN A CHOICE OF THREE

6 = TO IDENTIFY INITIAL LETTERS, GIVEN THE NAME OR SOUND OF THE LETTER

7 = TO IDENTIFY PICTURES OF OBJECTS WHICH HAVE AN ENDING SOUND THAT RHYMES

8 = TO IDENTIFY WORDS, GIVEN THE SOUND OF THE WORD